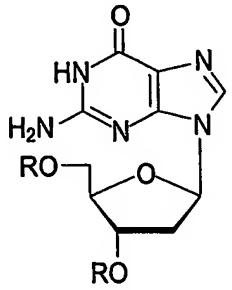
CLAIMS

We claim:

1. A method for producing 2-chloro-2'-deoxyadenosine comprising the steps of:

(a) converting the 6-oxo group of a compound having the formula



wherein R is a protecting group, into a 6-(substituted oxy) group having sufficient reactivity in an S_NAr displacement reaction;

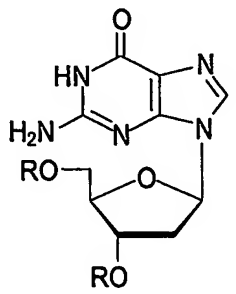
(b) replacing the 2-amino group with a 2-chloro group by a diazotization/chloro-dediazoniation reaction;

(c) replacing the 6-(substituted oxy) leaving group with a 6-amino group; and

(d) removing the R protecting groups, to produce 2-chloro-2'-deoxyadenosine.

5. A method for producing 2-chloro-2'-deoxyadenosine comprising the steps of:

(a) converting the 6-oxo group of a compound having the formula



wherein R is a protecting group selected from the group consisting of acetyl, benzoyl, into a 6-leaving group having greater reactivity than that of the 2-chloro group in an S_NAr displacement reaction;

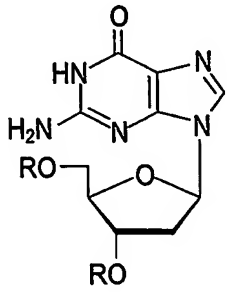
(b) replacing the 2-amino group with a 2-chloro group by diazotization/chloro-dediazoniation of the 2-amino group;

(c) replacing the 6-leaving group with a 6-amino group by selective ammonolysis of the 6-leaving group; and

(d) removing the R protecting groups by deacylation, to produce 2-chloro-2'-deoxyadenosine.

6. A method for producing 2-chloro-2'-deoxyadenosine comprising the steps of:

(a) reacting the 6-oxo group of a compound having the formula



wherein R is a protecting group selected from the group consisting of acyl and silyl, with an (alkyl or any substituted alky or cycloalkyl) sulfonyl or phosphoryl reagent or (aryl or any substituted aryl) sulfonyl or phosphoryl reagent to convert the 6-oxo group to a 6-*O*-(alkyl, cycloalkyl, or aryl) sulfonyl or phosphoryl group;

(b) reacting the product of step (a) with a halide and an organic nitrite in a solvent compatible with the halide to replace the 2-amino group with a 2-chloro group by diazotization/chloro-dediazoniation of the 2-amino group;

(c) reacting the product of step (b) with ammonia in a solvent or with a nitrogen source capable of being converted to an amino group in a solvent compatible with the nitrogen source to replace the 6-leaving group with a 6-amino group by selective ammonolysis of the 6-leaving group; and

(d) reacting the product of step (c) with a basic reagent in a compatible solvent to remove the R protecting groups by deacylation, to produce 2-chloro-2'-deoxyadenosine.

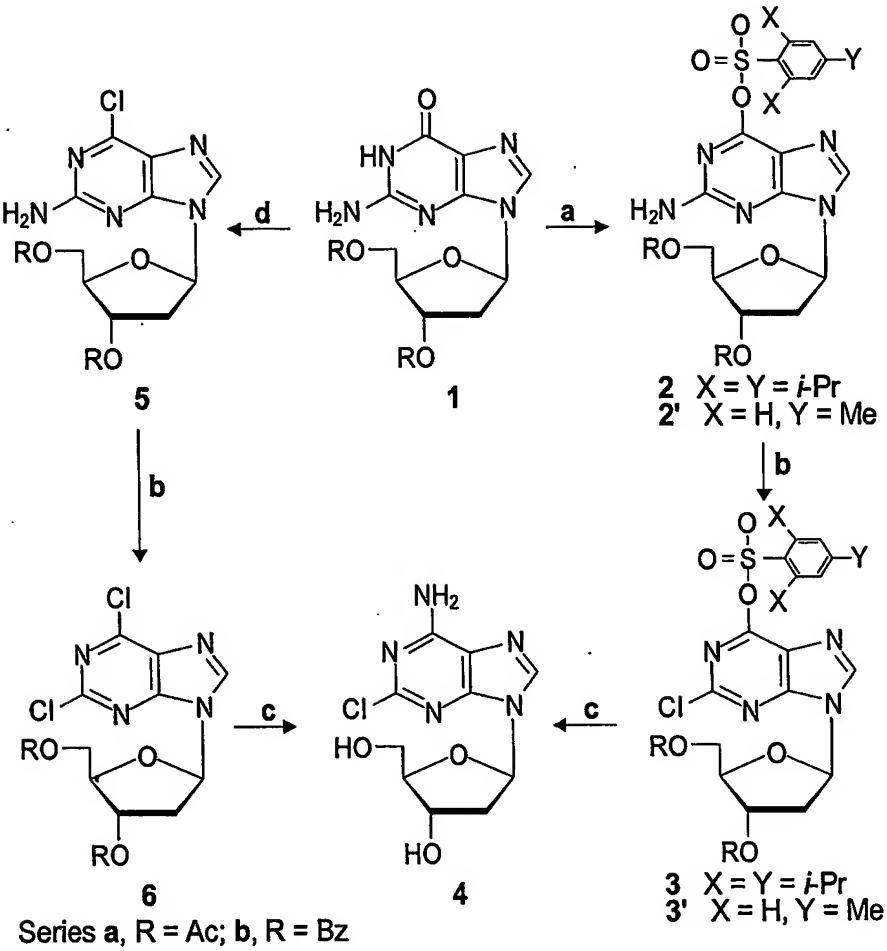


Figure 1

[a] (a) TiPBS-Cl/Et_3N/DMAP/CH_2Cl_2. (b) AcCl/BTEA-NO_2/CH_2Cl_2/–5 to 0 °C. (c) NH_3/MeOH/CH_2Cl_2/Δ. (d) $POCl_3$/BTEA-Cl/*N,N*-dimethylaniline/MeCN/Δ.

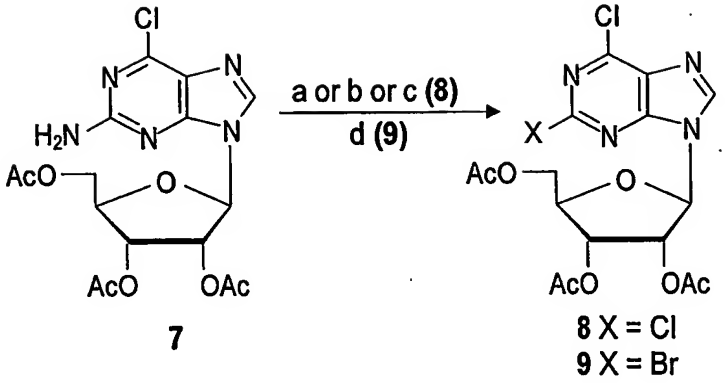


Figure 2

(a) TMS-Cl/BTEA-NO_2/CH_2Cl_2 (83%); (b) TMS-Cl/BTEA-NO_2/$NaNO_2$/CH_2Cl_2 (86%); (c) AcCl/BTEA-NO_2/CH_2Cl_2/0-5 C° (84%); (d) TMS-Br/TBN/CH_2Br_2 (85%)